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EXAMINER

BHATNAGAR, ANAND P

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 01/14/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/418,142

Applicant(s)

AVILA ET AL.

Examiner

Anand Bhatnagar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10, 12-21 and 23-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10, 12-21, and 23-42 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

***Response to Arguments***

1. Applicant's amendment (paper #9) filed on 10/14/03 has been entered and made of record.
2. Applicant's representative has canceled claims 9, 11, and 22. Claims 18 and 34 have been amended. Presently claims 1-8, 10, 12-21, and 23-42 are pending.
3. Examiner withdraws the objection to claims 18 and 34 since they have been amended.
4. Applicant's arguments (paper #9) filed on 10/14/03 have been fully considered but they are not persuasive. Applicant's representative in essence argues, bottom of page 9 and top of page 10, that the prior art of Holupka (U.S. patent 6,256,529 B1) does not describe nor suggest "an imaging system including an exam prescription subsystem which specifies the manner in which data is to be acquired and a visualization subsystem responsible for controlling display of acquired images and data, wherein the visualization subsystem is configured to operate in a volume autoview mode so that during data acquisition, a real-time, incrementally updated, three dimensional view of the data is displayed, wherein the volume autoview mode can be performed in a rock mode wherein a rotation angle is applied to a 3D model, the rotation angle varying cyclically as the 3D model is rendered from frame to frame." Examiner disagrees.

Holupka discloses a system where "an imaging system including an exam prescription subsystem which specifies the manner in which data is to be

acquired (fig. 1A elements 13,14, and 16 and col. 4 lines 41-47, where the software on the computer #16 specifies how to obtain the data, i.e. 3D, orthogonal 2D, oblique2D, etc.), and a visualization subsystem responsible for controlling display of acquired images and data (fig. 1A element 16 and col. 4 lines 41-47, where the software on the computer #16 specifies how to display the data, i.e. 2D slices, 3D, etc.), wherein the visualization subsystem is configured to operate in a volume autoview mode so that during data acquisition, a real-time, incrementally updated, three dimensional view of the data is displayed (col. 4 lines 64-67, where the images are 3D data obtained is in real time, i.e. meaning automatically being updated. These data images are obtained at incremental times from  $t=0$  to current time  $t$ .), wherein the volume autoview mode can be performed in a rock mode wherein a rotation angle is applied to a 3D model, the rotation angle varying cyclically as the 3D model is rendered from frame to frame" (fig. 10 and col. 8 lines 10-25, where two angles ( $\theta$  and  $\phi$ ) that can vary from 0 to 360 degrees are incorporated into the image data to take into account the rotation and this is cyclical since cosine and sine functions are cyclical in nature). It is inherent that one can name/configure any mode or subsystem by any specific terminology desired.

Applicant's representative argues, regarding claim 35 in paper #9 middle of page 10, that Holupka does not describe nor suggest "a method for operating a medical imaging system to generate three dimensional models while the system acquires a first slice of data, and generating a three dimensional model

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based on the first slice of data." Examiner disagrees. The feature of obtaining cross sectional data while generating 3D data has not been given a lot of weight since this feature is only in the preamble and not in the main body of claim language. Also, nowhere in the claim language is stated that 3D data is obtained from only the first slice of image and no other images. Holupka discloses "a method for operating a medical imaging system to generate three dimensional models while the system acquires a first slice of data (col. 5 lines 2-10 and 49-52, where 3D images are generated from obtained 2d data while transverse and orthogonal data is obtained and also multiple slices of image data are obtained from which 3D data is generated), and generating a three dimensional model based on the first slice of data" (col. 5 lines 6-10 and 49-52, where multiple slices are obtained and 3D data generated. The set of images obtained are seen as a first slice to a (n) number of slices from which 3D data is obtained).

Applicant's representative argues, in paper # 9 page 11 bottom paragraph, that the combination Holupka (U.S. patent 6,256,529 B1) and Vining (U.S. patent 5,782,762) is not a proper rejection and that an obviousness cannot be established by merely suggesting it. Applicant's representative also argues, paper #9 page 12 middle paragraph and page 13 bottom paragraph, that the combination of Holupka and Vining does not teach or suggest "an imaging system including an exam prescription subsystem which specifies the manner in which data is to be acquired and a visualization subsystem responsible for controlling display of acquired images and data, wherein the visualization

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subsystem is configured to operate in a volume autoview mode so that during data acquisition, a real-time, incrementally updated, three dimensional view of the data is displayed, wherein the volume autoview mode can be performed in a rock mode wherein a rotation angle is applied to a 3D model, the rotation angle varying cyclically as the 3D model is rendered from frame to frame” and that one cannot use hindsight reconstruction.

As for the argument for it being an improper combination and for an obviousness reason to combine. Examiner disagrees that this is an improper combination since both of the prior art are in the field of obtaining medical image slices and generating 3D image data from these slices, nowhere in the claim language does the applicant state on how the 3d data is generated in his instant invention. As for the obviousness argument examiner did not use obviousness argument in combining the references but pointed to a motivation in the prior art of Vining to combine the elements of Vining to that of Holupka. For example, regarding claim 4 rejection in the examiner's office action (paper #8) page 7, a motivation was given to combine the feature of placing the data onto film, of Vining, to the system of Holupka to have a record for future viewing which was from the prior art of Vining (col. 7 lines 53 and 54) and cited in the office action by the examiner and was not an obviousness reasoning by one skilled in the art. As for the argument where the combination of Vining and Holupka does not teach or suggest “an imaging system including an exam prescription subsystem which specifies the manner in which data is to be acquired and a visualization

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subsystem responsible for controlling display of acquired images and data ....”

As discussed above, these features were taught by Holupka alone. As for the hindsight reconstruction argument:

**In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).**

Applicant's representative further argues, regarding claim 19 paper #9 page 15, that the neither Holupka nor Vining, alone or in combination, describe or suggest “a vidualization subsystem for a medical imaging system, the medical imaging system including a data acquisition system for acquiring scan data, The visualization subsystem including a processor programmed to render an image from data received from at least one of the data acquisition system, a filtering component of the visualization subsystem, and a segmentation subsystem of the visualization subsystem, wherein the processor is further programmed to classify data into separate categories.” Examiner disagrees.

Holupka discloses an imaging system wherein said visualization subsystem comprises a rendering component configured to receive data from at least one of a data acquisition system (Holupka; fig. 1 elements 13 and 14 and col. 5 lines 49-56, where the 2D images are stacked and a rendered 3D image is produced from these 2D image data which is obtained from the image processor card, the image processor card is read as the data acquisition system), a filtering component of said visualization subsystem (Holupka; col. 6 lines 19-23, where

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filters can be used to remove noise for better display of images), said rendering component configured to generate multiple images based on the acquired data in at least one of a real-time mode and a post-acquisition mode (Holupka; col. 4 lines 41-47 and 55-57, where 2D and/or 3D images are generated based on the data obtained and are performed in real time or after acquiring the data "post acquisition").

As for the limitation of: a segmentation subsystem of said visualization subsystem.

Holupka discloses to render a 3D image from obtained 2D data by stacking the 2D images and to display these images (Holupka et al.; fig. 1 elements 13-16, the display attached to the computer in fig. 1, and col. 5 lines 50-56). Holupka et al. does not teach to segment the images to display them. Vining teaches to segment the images and display these segmented images (Vining; fig. 1 elements 70 and 80 and col. 11 lines 2-6). It would have been obvious to one skilled in the art to combine the reference of Vining to that of Holupka et al. because they are analogous in 3D imaging. One in the art would have been motivated to incorporate the teaching, segmentation of images, of Vining into the system of Holupka et al. in order to segment an organ of interest/ROI from the image for study (Vining; col. 2 lines 65-67).

Applicant's representative further argues, paper #9 bottom of page 16 and top of page 17, that combining the prior art of Edwards (U.S. patent 5,787,889) to Holupka and Vining is not a proper combination and that obviousness cannot be



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merely stated. Examiner disagrees. Examiner believes the combination is proper because all the features of claim 1 were disclosed by Holupka, as discussed above, and that all prior art applied (Edwards, Holupka, and Vining) all rendering 3D medical images. Since all these prior art references are all in the field of medical imaging the examiner believes that it would have been obvious to one skilled in the art to combine the teachings.

**Applicant further argues, in paper #9 on top of page 19, that the 103 rejection is based on hindsight reconstruction. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).**

Examiner refers to the previous rejection (paper #8).

### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35

U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 6, 7, 17, 18 and 35-41 rejected under 35 U.S.C. 102(e) as being anticipated by Holupka et al. (U.S. patent 6,256,529 B1).

Regarding claim 1: An imaging system comprising:

Holupka et al. discloses an exam prescription subsystem which specifies the manner in which data is to be acquired (fig. 1A elements 13,14, and 16 and col. 4 lines 41-47, where the software on the computer #16 specifies how to obtain the data, i.e. 3D, orthogonal 2D, oblique2D, etc.) and a visualization subsystem responsible for controlling display of acquired images and data (fig. 1A element 16 and col. 4 lines 41-47, where the software on the computer #16 specifies how to display the data, i.e. 2D slices, 3D, etc.), wherein said visualization subsystem is configured to operate in a volume autoview mode so that during data acquisition, a real-time, incrementally updated, three-dimensional view of the data is displayed (col. 4 lines 64-67, where the images are 3D data obtained is in real time, i.e. meaning automatically being updated. These data images are obtained at incremental times from  $t=0$  to current time  $t$ .) wherein said volume autoview mode can be performed in a rock mode wherein a rotation angle is applied to a 3D model, said rotation angle varying cyclically as the 3D model is rendered from frame to frame (fig. 10 and col. 8 lines 10-25, where two angles ( $\theta$  and  $\varphi$ ) that can vary from 0 to 360 degrees are incorporated into the image data to take into account the rotation and this is cyclical since cosine and sine functions are cyclical in nature).

Regarding claim 2: An imaging system in further comprising a data acquisition system for acquiring scan data (fig. 1 element 14), and an operator console comprising said exam prescription subsystem and said visualization subsystem (fig. 1 elements 13-16, the operator interface, and the display unit, all these units together make up the operator console).

Regarding claim 3: An imaging system further comprising an archive subsystem for storage of imaging data (fig. 1 and col. 5 lines 60-67, where there is an image data archive incorporated in the system).

Regarding claim 6: An imaging system wherein said exam prescription subsystem acquires parameter data comprising at least one of a sequence of slice locations, slice thickness, field-of-view, scanning technique, and reconstruction algorithm (col. 5 lines 2-10 and 50-53, where 2D image slices are obtained and 3D image rendering is produced. It is inherent that the locations and thickness of each slice must be tracked so that a proper 3D image can be produced).

Regarding claim 7: An imaging system wherein said parameter is contained in a scan protocol (fig. 1 element 14 and col. 5 lines 2-5, where the data obtain is contained in the image processor card, the image processor card is read as the "scan protocol").

Regarding claim 17: An imaging system wherein said rendering subsystem is operable in at least one of a single slice mode and a multiple slice mode (col. 5 lines 3-5, where multiple slices are obtained).

Regarding claim 18: An imaging system wherein said system utilizes at least one of computed tomograph, magnetic resonance, and ultrasound acquired data to generate an image (col. 4 lines 23-27).

Regarding claim 35: Holupka et al. discloses a method for operating a medical imaging system to generate three dimensional models while the system acquires cross-sectional data (col. 5 lines 2-8 and 49-52, where 3D images are generated from obtained 2d data while transverse and orthogonal data is obtained), said method comprising the steps of:

acquiring a first slice of data (col. 5 lines 6-10, where slices are obtained);

and

generating a three dimensional model based on the first slice of data (col. 5 lines 49-52).

Regarding claim 36: A method wherein generating a three dimensional model comprises the step of filtering the data (Holupka; col. 6 lines 19-23, where filters can be used to remove noise for better display of images).

Regarding claim 37: A method wherein generating a three dimensional model comprises the step of classifying the data into separate categories (col. 4 lines 40-47, where the data are classified as 3D, orthogonal 2D, oblique 2D, and/or translucent 3D).

Regarding claim 38: A method further comprising the step of performing measurements on the data, the measurements comprising at least one of distance, surface area, volume, regions of interest, and calcification scoring (col.

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7 lines 23-27, where the volume scanning is used to determine positions within the patient, the positions are read as the regions of interest).

Regarding claim 39: A method wherein generating a three dimensional model comprises the step of annotating patient and scanning information. It is well known to provide patient information and scanning information on the gathered images of X-ray, CT, and/or MRI of a patient. Examiner takes Official Notice.

Regarding claim 40: A method wherein generating a three dimensional mode comprises incrementally updating a three-dimensional view of the data (Holupka et al.; col. 4 lines 64-67, where the images are obtained in real time. It is inherent that these images are constantly being updated during the procedure).

Regarding claim 41: A method further comprising the step of applying a rotation angle to the model, the rotation angle varying cyclically as the model is rendered from frame to frame (col. 5 lines 1-4, where the transducers are rotate around an axis to obtain the 3D images, examiner reads as changing or adding angles to obtain the 3D images).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

A.) Claims 4, 5, 8, 12, 19, 20, 21, 23-29, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holupka et al. (U.S. patent 6,256,529 B1) and Vining (U.S. patent 5,782,762).

Regarding claim 4: An imaging system further comprising a filming subsystem for transferring data onto film.

Holupka discloses to render a 3D image from obtained 2D data by stacking the 2D images and to display these images (Holupka et al.; fig. 1 elements 13-16, the display attached to the computer in fig. 1, and col. 5 lines 50-56). Holupka et al. further discloses to archive the obtained data (Holupka et al.; fig. 1 and col. 5 lines 60-62). Holupka et al. does not teach to transfer the data onto film. Vining et al. teaches to place the obtained data onto a video (Vining; fig. 3 element 30 and col. 7 lines 52-55, the video is read as the film because it is taped on a video cassette). It would have been obvious to one skilled in the art to combine the reference of Vining to that of Holupka et al. because they are analogous in 3D imaging. One in the art would have been motivated to incorporate the teaching, filming the data, of Vining et al. to that of Holupka et al. so that a permanent record can be made for future viewing (Vining; col. 7 lines 53-54).

Regarding claim 5: An imaging system further comprising a networking subsystem that transfers data via a network to external devices. Holupka et al. does not teach to network to devices. Vining further teaches to network the information to other devices or computer systems (Vining; col. 9 lines 12-25). Neither Holupka et al. nor Vining teach to network the data to external devices. Examiner takes official notice because networking to external devices is well known in the art.

Regarding claims 12 and 29: An imaging system in accordance with wherein said visualization subsystem is configured to operate in a review display mode, said review display mode comprising at least one of a playback mode and a repeat loop mode.

Holupka discloses to render a 3D image from obtained 2D data by stacking the 2D images and to display these images (Holupka et al.; fig. 1 elements 13-16, the display attached to the computer in fig. 1, and col. 5 lines 50-56). Holupka et al. further discloses to archive the obtained data (Holupka et al.; fig. 1 and col. 5 lines 60-62). Holupka et al. does not teach for the display system to contain a review display mode which is composed of a playback mode and a repeat loop mode. Vining et al. teaches to place the obtained data onto a video (Vining; fig. 3 element 30) wherein most videos contain a playback mode as well as a repeat loop mode (where the same segment of a video or the whole video is constantly played back in a loop). It would have been obvious to one skilled in the art to combine the reference of Vining to that of Holupka et al.

because they are analogous in 3D imaging. One in the art would have been motivated to incorporate the playback and the repeat loop mode into the system of Holupka et al. so that a user may play back the stored data as well as play it back more than one time (repeat loop) so that the user can analyze the data until he is confident of the result.

Regarding claims 8 and 19: An imaging system wherein said visualization subsystem comprises a rendering component configured to receive data from at least one of a data acquisition system (Holupka; fig. 1 elements 13 and 14 and col. 5 lines 49-56, where the 2D images are stacked and a rendered 3D image is produced from these 2D image data which is obtained from the image processor card, the image processor card is read as the data acquisition system), a filtering component of said visualization subsystem (Holupka; col. 6 lines 19-23, where filters can be used to remove noise for better display of images), said rendering component configured to generate multiple images based on the acquired data in at least one of a real-time mode and a post-acquisition mode (Holupka; col. 4 lines 41-47 and 55-57, where 2D and/or 3D images are generated based on the data obtained and are performed in real time or after acquiring the data "post acquisition"), wherein said processor is further programmed to classify data into separate categories (Holupka et al.; col. 4 lines 40-47, where the data are classified as 3D, orthogonal 2D, oblique 2D, and/or translucent 3D).

As for the limitation of: a segmentation subsystem of said visualization subsystem.



Holupka discloses to render a 3D image from obtained 2D data by stacking the 2D images and to display these images (Holupka et al.; fig. 1 elements 13-16, the display attached to the computer in fig. 1, and col. 5 lines 50-56). Holupka et al. does not teach to segment the images to display them. Vining teaches to segment the images and display these segmented images (Vining; fig. 1 elements 70 and 80 and col. 11 lines 2-6). It would have been obvious to one skilled in the art to combine the reference of Vining to that of Holupka et al. because they are analogous in 3D imaging. One in the art would have been motivated to incorporate the teaching, segmentation of images, of Vining into the system of Holupka et al. in order to segment an organ of interest/ROI from the image for study (Vining; col. 2 lines 65-67).

Regarding claim 20: A visualization subsystem wherein to render an image, said processor is programmed to generate multiple images based on the acquired data in at least one of a real-time mode and a post-acquisition mode (Holupka; col. 4 lines 41-47 and 55-57, where 2D and/or 3D images are generated based on the data obtained and are performed in real time or after acquiring the data "post acquisition").

Regarding claim 21: A visualization subsystem in accordance with Claim 19 wherein said processor is further programmed to apply image processing filters to the data received from the data acquisition system (Holupka; col. 6 lines 19-23, where filters can be used to remove noise for better display of images).

Regarding claim 23: A visualization subsystem in accordance with Claim 19 wherein said processor is further programmed to perform measurements on the data, said measurements comprising at least one of distance, surface area, volume, regions of interest, and calcification scoring (col. 7 lines 23-27, where the volume scanning is used to determine positions within the patient, the positions are read as the regions of interest).

Regarding claim 24: A visualization subsystem wherein the image is rendered in at least one of a real-time mode and a post-acquisition mode (Holupka; col. 4 lines 41-47 and 55-57, where 2D and/or 3D images are generated based on the data obtained and are performed in real time or after acquiring the data "post acquisition").

Regarding claim 25: A visualization subsystem wherein said processor is further programmed to annotate patient and scanning information It is well known to provide patient information and scanning information on the gathered images of X-ray, CT, and/or MRI of a patient. Examiner takes Official Notice.

Regarding claim 26: A visualization subsystem wherein said processor is further programmed to operate in a volume autoview mode so that during data acquisition, a real-time, incrementally updated, three-dimensional view of the data is displayed (Holupka et al.; col. 4 lines 64-67, where the images are obtained in real time. It is inherent that these images are constantly being updated during the procedure).

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Regarding claim 27: A visualization subsystem wherein said processor is further programmed to operate in a static data rendering mode and a mixed data rendering mode. Holupka et al. discloses to obtain data regular images (static mode) as well as obtain images in real time (dynamic mode) (Holupka et al.; col. 4 lines 40-47 and 64-67). It would have been obvious to one skilled in the art to modify the system of Holupka where different display options of the images is available, such as displaying a static image or a mixed mode (where a static and dynamic image is displayed).

Regarding claim 28: A visualization subsystem wherein said volume autoview mode can be performed in a rock mode wherein a rotation angle is applied to a 3D model, said rotation angle varying cyclically as the 3D model is rendered from frame to frame (Holupka et al.; col. 5 lines 1-4, where the transducers are rotate around an axis to obtain the 3D images, examiner reads as changing or adding angles to obtain the 3D images).

Regarding claim 34: A visualization subsystem wherein the scan data at least one of computed tomograph, magnetic resonance, and ultrasound acquired data (Holupka et al.; col. 4 lines 23-27).

B.) Claims 13-16 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holupka et al. (U.S. patent 6,256,529 B1) and Edwards et al. (U.S. patent 5,787,889).

Regarding claims 13 and 42: An imaging system wherein said visualization subsystem generates at least one volumetric model, and wherein projection of said volumetric model onto an image plane is accomplished using at least one of ray casting and texture mapping.

Holupka discloses to render a 3D image from obtained 2D data by stacking the 2D images (Holupka et al.; fig. 1 elements 13-16, the display attached to the computer in fig. 1, and col. 5 lines 50-56). Holupka et al. further teaches to display the 3D images onto a display (Holupka et al.; fig. 1). Holupka et al. does not teach how the 3D volume image data is transformed to fit the 2D display image. Edwards et al. teaches to use ray casting to transform data from a 3D image space into 2D image space (Edwards et al.; col. 13 lines 46-51). It would have been obvious to one skilled in the art to combine the teaching of Edwards et al. to that of Holupka et al. because they are analogous in 3D imaging. Ray casting is a well known technique to transform data from 2D to 3D space and vice versa.

Regarding claim 14: An imaging system wherein said volumetric model is incrementally rendered (Holupka et al.; col. 4 lines 64-67, where the images are obtained in real time. It is inherent that these images are constantly being updated during the procedure).

Regarding claim 15: An imaging system wherein said volumetric model is rendered using a sliding window (Holupka et al.; col. 5 lines 43-46, where a real

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time window is used, i.e. the information being updated as data is gathered in real time).

Regarding claim 16: An imaging system wherein said volumetric model is defined in a hierarchical data structure (Holupka et al.; col. 5 lines 1-14, where an orthogonal or transverse slice through the 3D space is obtained).

C.) Claims 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holupka et al. (U.S. patent 6,256,529 B1) as modified by Vining (U.S. patent 5,782,762) and further view of Edwards et al. (U.S. patent 5,787,889).

Regarding claim 30: It is rejected for the same reason as claim 13.

Regarding claim 31: It is rejected for the same reason as claim 14.

Regarding claim 32: It is rejected for the same reason as claim 15.

Regarding claim 33: It is rejected for the same reason as claim 16.

D.) Claims 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Holupka et al. (U.S. patent 6,256,529 B1).

Regarding claim 10: A visualization subsystem wherein said processor is further programmed to operate in a static data rendering mode and a mixed data rendering mode. Holupka et al. discloses to obtain data regular images (static mode) as well as obtain images in real time (dynamic mode) (Holupka et al.; col. 4 lines 40-47 and 64-67). It would have been obvious to one skilled in the art to

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modify the system of Holupka where different display options of the images is available, such as displaying a static image or a mixed mode (where a static and dynamic image is displayed).

***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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**Contact Information**

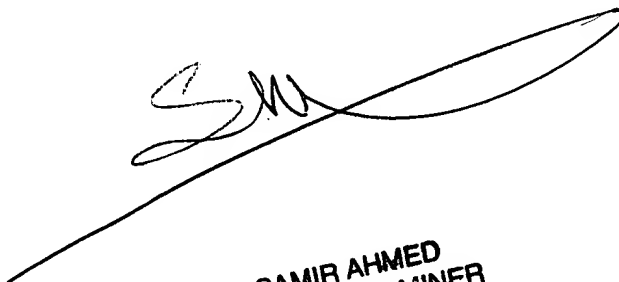
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anand Bhatnagar whose telephone number is (703) 306-5914, whose supervisor is Amelia Au whose number is 703-308-6604, group fax is 703-872-9314, and Tech center 2600 customer service office number is 703-306-0377.

AB

Anand Bhatnagar

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January 11, 2004



**SAMIR AHMED  
PRIMARY EXAMINER**